

Driving Shafts

With Flange

Rotary Shafts suitable for driving motion. Accuracies and shapes needed for rotary driving applications are selectable.

Driving Shafts – With Flange

Type	D, P Tolerance	Concentricity	Material	Hardness	Surface Treatment
KZEN	h6	φ0.01	1045 Carbon Steel or Equivalent	—	—
KZEC			Black Oxide		
KZEP			Electroless Nickel Plating		
KZES			—		
KZEF			1045 Carbon Steel or Equivalent	Induction Hardened Surface Hardness 50 HRC min.	—

$\ell = L - (LA + T)$ $\ell + T \leq L/2$
 The shaft may have Center holes on ends.
 There is an undercut 1.5 mm or less in width and 0.3 mm or less in depth on the stepped part.

D	Tolerance h6	Circularity M
8	0	0.003
10	-0.009	
12, 12A	0	
15	-0.011	
20	0	0.005
25	-0.013	
30	0	
35	0	
40	-0.016	
45	0	

*Ds: Tap dimension of Bearing Inner Race, reference: P.1028.

Part Number Type	0.5 mm Increment		1 mm Increment		0.5 mm Increment		H	Ds
	D	L	T	P	LA	LA		
KZEN KZEC KZEP KZES KZEF	8	50.0-220.0	5	6-9	4.0-40.0	12	10	
	10	50.0-300.0	10	8-12	5.0-50.0	15	13	
	12		10-13	5.0-60.0	14			
	12A	100.0-400.0	10	12-18	5.0-75.0	20	18	
	15		14-18	5.0-100.0	19			
	17	100.0-500.0	20	17-23	10.0-125.0	25	21	
	17A		20-28	15.0-150.0	24			
	20	200.0-500.0	25	25-33	20.0-150.0	30	29	
	25		28-38	35	34			
	30		30	35-47		40	39	
35	35-48		40	48				
40		40	49					
45		50						

Available Types

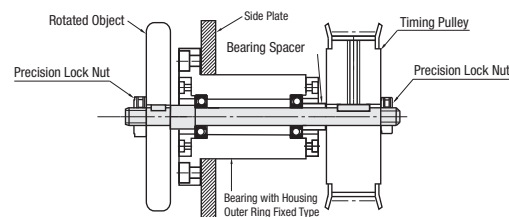
Type	KZEN, KZEC, KZEP, KZES, KZEF					
	D	Min. L-100.0	L100.5-200.0	L200.5-300.0	L300.5-400.0	L400.5-500.0
8	•	•	•	•	•	•
10	•	•	•	•	•	•
12	•	•	•	•	•	•
12A	•	•	•	•	•	•
15	•	•	•	•	•	•
17	•	•	•	•	•	•
17A	•	•	•	•	•	•
20	•	•	•	•	•	•
25	•	•	•	•	•	•
30	•	•	•	•	•	•
35	•	•	•	•	•	•
40	•	•	•	•	•	•
45	•	•	•	•	•	•

Part Number Example: **KZEN30 - 350 - T20 - P25 - LA50**

KZEF (Induction Hardened)

When alterations on the right page are specified, the shafts are induction hardened (except the threaded sections) after machining. As a result, this may occur:
 (1) : Due to thermal conduction to the thread, the threads may be hardened by 2-3 mm.
 (2) : Induction Hardened may shrink the keyway width (around -0.01 - -0.02). If the key becomes hard to fit, adjust it by gauging.

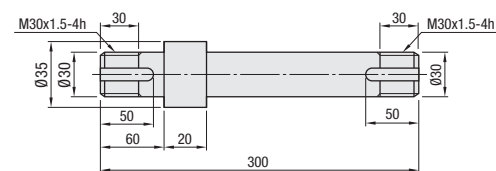
Application Example



Selection of Driving Shaft

In selecting a driving shaft, select the basic shape and size from the specification table, then select necessary alterations such as thread machining, keyway addition etc.

Selection Example of Part No. >
 Alteration Selection: Two Threaded Ends (Fine Thread, Precision Class), Two Keyways



Driving Shafts

With Flange, continued

Part Number Alterations: **KZEF30 - 300 - T20 - P30 - LA60 - MMA30 - MMB30 - KA0 - HA50 - KBO - HB50** (MA, NA, KA, TA, SA, WA...etc.)

Alterations	Code		Spec.																																																																																	
	Left End	Right End																																																																																		
Threaded Ends 	MA MSA MMA	MB MSB MMB	Adds threads at shaft ends. Specify the length of the threads. (For accuracy, coarse or fine threads can be specified by an ordering code.) Ordering Code: MA15-MSB15 1 mm Increment 5≤Thread length≤Mx5, LA-2 <table border="1"> <thead> <tr> <th>Code</th> <th>Screw Precision</th> <th>M (Coarse)</th> <th>Pitch</th> <th>M (Fine)</th> <th>Pitch</th> <th>M (Fine)</th> <th>Pitch</th> </tr> </thead> <tbody> <tr> <td>MA</td> <td>MB</td> <td>Coarse</td> <td>JIS6h (Class 2)</td> <td>M6</td> <td>1.0</td> <td>M6</td> <td>0.75</td> </tr> <tr> <td>MSA</td> <td>MSB</td> <td>Fine (Coarse)</td> <td>JIS6h (Class 2)</td> <td>M8</td> <td>1.25</td> <td>M8</td> <td>0.75</td> </tr> <tr> <td>MMA</td> <td>MMB</td> <td>Fine (Precision)</td> <td>JIS4h (Class 1)</td> <td>M10</td> <td>1.5</td> <td>M10</td> <td>0.75</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td>M12</td> <td>1.75</td> <td>M12</td> <td>1.0</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td>M20</td> <td>2.5</td> <td>M15</td> <td>1.0</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td>M24</td> <td>3</td> <td>M17</td> <td>1.0</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td>M30</td> <td>3.5</td> <td>M20</td> <td>1.0</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td>M36</td> <td>4</td> <td></td> <td></td> </tr> </tbody> </table> Ⓢ When D, P=M, thread length can be specified.	Code	Screw Precision	M (Coarse)	Pitch	M (Fine)	Pitch	M (Fine)	Pitch	MA	MB	Coarse	JIS6h (Class 2)	M6	1.0	M6	0.75	MSA	MSB	Fine (Coarse)	JIS6h (Class 2)	M8	1.25	M8	0.75	MMA	MMB	Fine (Precision)	JIS4h (Class 1)	M10	1.5	M10	0.75					M12	1.75	M12	1.0					M20	2.5	M15	1.0					M24	3	M17	1.0					M30	3.5	M20	1.0					M36	4											
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Tapped Ends 	NA	NB	Adds a tap at the shaft end. Select the thread diameter. Ordering Code: NA5-NB5 Ⓢ NA, NB≤D (P)-4 <table border="1"> <thead> <tr> <th>NA (Coarse)</th> <th>NB (Coarse)</th> </tr> </thead> <tbody> <tr> <td>M3</td> <td>M4</td> </tr> <tr> <td>M5</td> <td>M6</td> </tr> <tr> <td>M8</td> <td>M10</td> </tr> <tr> <td>M12</td> <td>M16</td> </tr> <tr> <td>M20</td> <td>M30</td> </tr> </tbody> </table>	NA (Coarse)	NB (Coarse)	M3	M4	M5	M6	M8	M10	M12	M16	M20	M30																																																																					
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Keyway Machining 	KA	KB KC	Adds a keyway. Specify the position and the length of the keyway. Ordering Code: KA10-HA30-KB100-HB50 KA / HA / KB / HB / KC / HC = 1 mm Increment Ⓢ 3≤HA / HB / HC≤100 Ⓢ For keyway details refer to P.853. Ⓢ When more than 2 keyways are added / the tolerances may shift by up to 0.2%. Ⓢ Specify the keyway position more than 2mm away from the flanged part.																																																																																	
Keyway Machining + Set Screw Flat 	ZA	ZB ZC	Adds a flat at any designated angle based on the keyways. Specify the position and the length for each keyway / and the angle for the set screw flats. Ordering Code: ZA40-HA20-AA90 ZA / HA / ZB / HB / ZC / HC / ZD / HD = 1 mm Increment AA / AB / AC / AD=30° Increment 30°≤AA / AB / AC / AD≤330° Ⓢ 3≤HA / HB / HC / HD≤100 Ⓢ For keyway details refer to P.853. Ⓢ Specify the keyway position more than 2 mm away from the flanged part. <table border="1"> <thead> <tr> <th>Keyway Position Specified</th> <th>Keyway Width Specified</th> <th>Angle Specified 30° Increment</th> <th>D / P</th> <th>6-17</th> <th>18-40</th> <th>41-48</th> </tr> </thead> <tbody> <tr> <td>ZA</td> <td>HA</td> <td>AA</td> <td>H</td> <td>1</td> <td>2</td> <td>3</td> </tr> <tr> <td>ZB</td> <td>HB</td> <td>AB</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>ZC</td> <td>HC</td> <td>AC</td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table> Ⓢ The length of each set screw flat is the same as that of each keyway. Ⓢ For a keyway and the angle of a set screw flat, the tolerances may shift by up to ±0.2%.	Keyway Position Specified	Keyway Width Specified	Angle Specified 30° Increment	D / P	6-17	18-40	41-48	ZA	HA	AA	H	1	2	3	ZB	HB	AB					ZC	HC	AC																																																									
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Retaining Ring Groove 	TA	TB	Adds a retaining ring groove. Specify the position of a retaining ring groove. Ordering Code: TA10-TB100 TA / TB = 1 mm Increment Ⓢ 4≤TA≤LA-3 Ⓢ Retaining rings are attached. Ⓢ Detailed "Retaining Ring Groove Dimensions Rotary & Driving Shafts" on P.853. Ⓢ P = 27 / 31 / 33-34 / 36-39 Not available for 41-44 and 46-48. <table border="1"> <thead> <tr> <th rowspan="2">Material</th> <th rowspan="2">Hardness</th> <th rowspan="2">Surface Treatment</th> <th colspan="2">Retaining Ring</th> </tr> <tr> <th>Material</th> <th>Material</th> </tr> </thead> <tbody> <tr> <td>1045 Carbon Steel or Equivalent</td> <td>—</td> <td>Black Oxide</td> <td>Spring Steel</td> <td>Spring Steel</td> </tr> <tr> <td>304 Stainless Steel</td> <td>—</td> <td>Electroless Nickel Plating</td> <td>304 Stainless Steel-CSP</td> <td>304 Stainless Steel-CSP</td> </tr> <tr> <td>1045 Carbon Steel or Equivalent</td> <td>Surface 50 HRC min.</td> <td>—</td> <td>Spring Steel</td> <td>Spring Steel</td> </tr> </tbody> </table>	Material	Hardness	Surface Treatment	Retaining Ring		Material	Material	1045 Carbon Steel or Equivalent	—	Black Oxide	Spring Steel	Spring Steel	304 Stainless Steel	—	Electroless Nickel Plating	304 Stainless Steel-CSP	304 Stainless Steel-CSP	1045 Carbon Steel or Equivalent	Surface 50 HRC min.	—	Spring Steel	Spring Steel																																																											
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Wrench Flat 	SA SH	SB	Adds a Wrench Flat. Specify the position of a wrench flat. Ordering Code: SA5-SB10-SHA / SB = 1 mm Increment SA / SB ≥ 0SA ≤ LA - ℓ / SB ≤ L - LA - T - ℓ Ⓢ Specification of the length for SH is not necessary. Adds wrench flats on the shoulder. (ℓ = h) <table border="1"> <thead> <tr> <th>D</th> <th>8</th> <th>10</th> <th>12</th> <th>15</th> <th>17</th> <th>20</th> <th>25</th> <th>30</th> <th>35</th> <th>40</th> <th>45</th> </tr> </thead> <tbody> <tr> <td>W</td> <td>7</td> <td>8</td> <td>10</td> <td>13</td> <td>14</td> <td>17</td> <td>22</td> <td>27</td> <td>30</td> <td>36</td> <td>38</td> </tr> <tr> <td>ℓ</td> <td>8</td> <td></td> <td></td> <td></td> <td></td> <td>10</td> <td></td> <td></td> <td>15</td> <td></td> <td>20</td> </tr> </tbody> </table> <table border="1"> <thead> <tr> <th>P</th> <th>6</th> <th>7</th> <th>8-10</th> <th>11-13</th> <th>14-15</th> <th>16-18</th> <th>19-21</th> <th>22-25</th> <th>26-28</th> <th>29-31</th> <th>32-37</th> <th>38-41</th> <th>42-45</th> <th>46-48</th> </tr> </thead> <tbody> <tr> <td>W₁</td> <td>5</td> <td>5.5</td> <td>7</td> <td>10</td> <td>13</td> <td>14</td> <td>17</td> <td>19</td> <td>22</td> <td>27</td> <td>30</td> <td>36</td> <td>38</td> <td>41</td> </tr> <tr> <td>ℓ</td> <td>8</td> <td></td> <td></td> <td></td> <td></td> <td>10</td> <td></td> <td></td> <td></td> <td>15</td> <td></td> <td></td> <td>20</td> <td></td> </tr> </tbody> </table>	D	8	10	12	15	17	20	25	30	35	40	45	W	7	8	10	13	14	17	22	27	30	36	38	ℓ	8					10			15		20	P	6	7	8-10	11-13	14-15	16-18	19-21	22-25	26-28	29-31	32-37	38-41	42-45	46-48	W ₁	5	5.5	7	10	13	14	17	19	22	27	30	36	38	41	ℓ	8					10				15			20	
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2 Set Screw Flats (Angle Specified) 	WA	WB	Adds a flat at any designated angle besides the datum plane 0°. Specify the position, the length and the angle of the set screw flats. When 0° is specified, only one set screw flat is machinable. Ordering Code: WA15-GA10-AA0 WA, GA, GB = 1 mm Increment AA, AB = 30° Increment 0°≤AA, AB≤330° <table border="1"> <thead> <tr> <th>Set Screw Flat Position Specified</th> <th>Set Screw Flat Width Specified</th> <th>Angle Specified 30° Increment</th> <th>D / P</th> <th>6-17</th> <th>18-40</th> <th>41-48</th> </tr> </thead> <tbody> <tr> <td>WA</td> <td>GA</td> <td>AA</td> <td>H</td> <td>1</td> <td>2</td> <td>3</td> </tr> <tr> <td>WB</td> <td>GB</td> <td>AB</td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>	Set Screw Flat Position Specified	Set Screw Flat Width Specified	Angle Specified 30° Increment	D / P	6-17	18-40	41-48	WA	GA	AA	H	1	2	3	WB	GB	AB																																																																
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Tolerance Change 	DJ (js6) DK (k6)		Changes the D dimension tolerance to js6 or k6. Ordering Code: DJ or DK																																																																																	

Ⓢ For dimensions of the retaining ring groove P.853. Ⓢ For Keyway details, see P.853.